

Weekly Report

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1 Work scheduled in last week

The work scheduled in last week are listed as below:

1. reconstruct an OOP version LBG-VQ project, if done, to implement the new solution and test it.
2. read papers and course materials to search new directions and ideas.
3. VIS 2013 paper collection will be finished in one day.
4. ask Jiangang to implment the HVQ method.
5. if needed, to implement the TVQ method.
6. study the relationship between compression quality and data distribution by using histogram first.

2 Introduction

The original plan is to complete the first three tasks and let the fourth above on its way. Due to the Middle Autumn Festival, only task 3 is done in last week. Besides, task 2 is also stepping. I have already collected some related papers for Jiangang to implement the HVQ algorithm and he was studying, however, no actual communication about this topic between us. A simple overview to all the major compression methods, will be displayed in following section.

3 Details

After the review of compression papers, till now, I have already formed a comparison, as well as a conclusion for all the methods mentioned in these papers.

As table 1 depicted, there are three kinds of method in volumetric datasets compression domain. For the third type, most of them are lossless method and these encoders are effective to be high compression ratio ones. The main drawback is the complex decode process. So, a lot of research in this field was put into finding encoding schemes, which have a fast random access for reconstruction. Quantization methods are always combined with transform methods, as part of the whole compression pipeline. Typically, quantization methods are lossy while the decompression is extremely fast and seems to be most suitable for compression domain volume rendering. However, quantization methods, e.g. VQ, are always data dependent. The compression rate and image quality is rely on the processed data itself very much. Furthermore, the size of codebook imposes a hard limit on achievable quality and compression rate. The transform methods, can be lossy or lossless, sometimes near lossless in practice, depend on the applications and data type.

4 Conclusion and Future Work

Take research purpose as the target, only the pros and cons of each main compression method are studied, as well as the comparison among them. It seems that to combine VQ and some other compression method

Transform/Decomposition	DFT DHT DCT DWT BWT KLT TA
Quantization/Thresholding	VQ
Encoding	RLE
	VBL
	LZW
	ZIP JPEG2000

Table 1: Compression methods for volumetric datasets.

will be the chosen. There still exists a great number of study work to be done in the future and I will try to do it as fast as I can. The main job in next week should be:

1. reconstrruct an OOP version LBG-VQ project.
2. read papers and course materials(must be done).
3. vis topic group meeting.
4. ask Jiangang to implment the HVQ method(take into action).

References